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Baker 19-3 RWB
10-22-03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): A.D. Baker et al.
Case: 19-3
Serial No.: 09/484,098
Filing Date: January 18, 2000
Group: 2157
Examiner: Gregory G. Todd

I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature: Teresa M. Hamlin Date: October 6, 2003

Title: Methods and Apparatus for Local Network Address Acquisition, Analysis and Substitution

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APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the final rejection dated May 5, 2003 of claims 1-21 of the above-identified application.

REAL PARTY IN INTEREST

The present application is currently assigned to Avaya Inc. Avaya Inc. is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences.

STATUS OF CLAIMS

Claims 1-21 are pending in the present application. Each of claims 1-21 stands finally rejected under 35 U.S.C. §102(e) or 35 U.S.C. §103(a). Claims 1-21 are appealed.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF INVENTION

The present invention is directed to an apparatus, method and machine-readable storage medium for use in interfacing a local network to one or more external network elements.

An illustrative embodiment of the invention is shown in FIG. 1 of the drawings, and includes a local area network (LAN) 102 and a gateway 110. The LAN 102 is coupled to personal computers PC-1, PC-2, . . . PC-N, a printer 104 and a file server 106. The gateway 110 communicates via a DSL access multiplexer (DSLAM) 112 with external networks 114 and 116.

As indicated on page 4, lines 9-13 of the specification, a significant problem associated with a conventional gateway in a system such as that of FIG. 1 is that IP address disparity can arise between the personal computers, printer, file server or other devices attached to the LAN 102, such that direct communications between these devices are routed through one or more of the external networks 114 and 116. This is clearly undesirable in that it unnecessarily consumes network and gateway processing resources.

The present invention solves this significant problem of the prior art by implementing an address substitution mechanism in the gateway 110. Generally, the gateway is configured to determine remotely-assigned address information for a given device attached to the LAN, and to establish, based at least in part on the remotely-assigned address information, a substitution address for use by at least one other device attached to the local network when communicating with the given device.

The address substitution mechanism in the illustrative embodiment is described as follows at page 4, lines 14-23 of the specification:

In accordance with the invention, gateway 110 is configured to intercept and store all address assignments issued by a remote network address server during an IP address assignment process, e.g. during a designated IP address exchange interval. The gateway 110 will then "trap" all incoming requests during, e.g., capabilities identification exchanges, and reissue the requests after evaluating and potentially adjusting the address fields thereof to a format suitable to each of the other devices on the LAN 102. Finally, at transport service time, the gateway 110 will receive individual message requests from devices on the LAN 102, map their addresses to appropriate substitution addresses, and reissue the messages with the altered addresses.

The address substitution mechanism implemented in the gateway 110 thus advantageously ensures that communications between devices attached to the local network are not routed through an external network as a result of disparity in their remotely-assigned IP addresses.

ISSUES PRESENTED FOR REVIEW

1. Whether claims 1-3, 5-13 and 15-21 are anticipated under 35 U.S.C. §102(e) by U.S. Patent No. 6,157,950 (hereinafter "Krishnan").

2. Whether claims 4 and 14 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,414,952 (hereinafter "Foley").

GROUPING OF CLAIMS

With regard to Issue 1, claims 1-3, 9,11-13, 19 and 21 stand or fall together, claims 5 and 15 stand or fall together, claims 6 and 16 stand or fall together, claims 7 and 17 stand or fall together, claims 8 and 18 stand or fall together, and claims 10 and 20 stand or fall together.

With regard to Issue 2, claims 4 and 14 stand or fall together.

ARGUMENT

Issue 1

Applicants initially note that MPEP §2131 specifies that a given claim is anticipated "only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," citing Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, MPEP §2131 indicates that the cited reference must show the "identical invention . . . in as complete detail as is contained in the . . . claim," citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Applicants submit that the Examiner has failed to establish anticipation of claims 1-3, 5-13 and 15-21 by the Krishnan reference.

Independent claim 1 is directed to an apparatus for use in interfacing a local network to one or more external network elements. The apparatus includes a gateway coupled between the local network and the one or more external network elements. The gateway is operative to perform the following functions:

(i) to determine remotely-assigned address information for a given device attached to the local network; and

(ii) to establish, based at least in part on the remotely-assigned address information, a substitution address for use by at least one other device attached to the local network when communicating with the given device.

Thus, in accordance with the invention, a LAN or other type of local network is interfaced with one or more external network elements via a gateway that advantageously implements an address substitution mechanism for ensuring that communications between devices attached to the local network are not routed through an external network as a result of, e.g., disparity in their remotely-assigned IP addresses.

The gateway in an illustrative embodiment described in the specification at page 4, lines 14-23, is configured to intercept communications from devices on the local network in order to determine remotely-assigned IP address information for those devices. After such information is determined for a given device, the gateway creates a set of address substitution information that includes sub-network compatible addresses for use by other devices on the local network when

communicating with the given device. The substitution addresses are then used in subsequent communications between the devices on the local network, thereby ensuring that communications between these devices are not routed through the external network.

Applicants note that the foregoing reference to an illustrative embodiment is intended merely to present a concrete example of one possible arrangement falling within the limitations of claim 1.

The Krishnan reference does not anticipate the above-described invention, as set forth in claim 1, and clearly does not provide the associated advantages of preventing communications between devices on the same local network from being routed through an external network as a result of disparity in their remotely-assigned IP addresses. Instead, the Krishnan reference is directed to an arrangement in which devices on the same local network share a single IP address, by allowing one of the devices, denoted as a gateway, to substitute its IP address for the IP addresses of the other devices on the same local network, when communicating with the external network. See Krishnan at column 3, lines 17-33, as cited and relied upon by the Examiner. Since Krishnan teaches that the gateway simply substitutes its own IP address for that of another device on the same local network, Krishnan does not solve the above-noted problem of communications between devices on the same local network being routed through an external network as a result of disparity in their remotely-assigned IP addresses. If certain devices on the local network in Krishnan have an undesirable disparity in their remotely-assigned IP addresses, the Krishnan gateway will route communications between those devices through the external network, as in a conventional system of the type described by Applicants at page 1, line 12 to page 2, line 4 of the specification. The present invention as set forth in claim 1, unlike the Krishnan arrangements, advantageously addresses and solves this significant problem of the prior art.

The Examiner argues in the final Office Action, at page 7, first and second full paragraphs, that the gateway in Krishnan performs operations (i) and (ii) above. Applicants respectfully disagree. As indicated above, Krishnan teaches a gateway which simply substitutes its own IP address for the IP addresses of other devices on the same local network when such devices are communicating with an external network. Such an arrangement does not read on the claimed address substitution, which as indicated previously involves utilizing remotely-assigned address information, as determined for a given device attached to a local network, to establish a substitution address for use by at least one

other device attached to the local network when communicating with the given device. Not only is the substitution address in Krishnan not established "based at least in part on the remotely-assigned address information," it is not an address "for use by at least one other device attached to the local network when communicating with the given device," as is required by claim 1. Instead, the substitution address in Krishnan, assuming for purposes of argument that it can be characterized as such, is always the gateway IP address, and as a result the claimed operations involving determination of remotely-assigned address information and establishment of a substitution address are not needed.

The Examiner in formulating the §102(e) rejection further relies on the disclosure in column 7, line 59, to column 8, line 9 of Krishnan. The cited portion of Krishnan provides as follows, with emphasis supplied:

> Computer 43 first assembles packet 40, which includes the IP address and port number of destination computer 46, e.g., 179.34.71.46:80, as well as its own source IP address and port number, e.g. 1.2.3.43:512. Because there is no direct connection between computer 43 and the Internet, packet 40 is routed on LAN 44 to gateway computer 41.
> Routing software on gateway computer 41 records the source IP address and port number, e.g., 1.2.3.43:512, and substitutes its own source IP address and a selected port number, e.g., 211.99.28.10:1037, into packet 40 to create packet 40'. The correspondence between the source IP address and source port number of computer 43, as well as a selected destination port number on gateway computer 41, are recorded in a table or database located on, or accessible to, gateway computer 41. Gateway computer 41 then forwards modified data packet 40' toward the original destination, possibly via additional gateways and routers, not shown in FIG. 4, until packet 40' reaches computer 46.

This is not determination in the gateway of a substitution address for use by at least one other device attached to the local network when communicating with the given device, as set forth in claim 1. Instead, the cited portions of Krishnan simply teach to replace a local network device source IP address with the gateway source IP address. The Krishnan arrangements will therefore suffer from

precisely the same problems noted above and more particularly identified by Applicants at page 1, line 25 to page 2, line 4 of the specification.

In other words, due to IP addressing disparity associated with remotely-assigned IP addresses on the local network, a communication from a given device on the local network in Krishnan that is directed to another device on the local network may have to be routed from the given device, out through the gateway to the external network, and back in from the external network through the gateway to the other device on the local network. The alteration of source IP addresses as described in Krishnan does not solve this problem, while the present invention as set forth in claim 1 does solve this problem.

Moreover, it should be noted with regard to claim 1 that the establishment of the substitution address is based at least in part on the determined remotely-assigned address information. Since the gateway in Krishnan simply replaces all source IP addresses of the local network devices with the gateway source IP address, there is no substitution address in Krishnan that is established based at least in part on the determined remotely-assigned address information as claimed.

The Examiner further argues in an Advisory Action mailed August 15, 2003, at page 2, second paragraph, that Krishnan in column 3, lines 61-67 teaches "to discard packets destined on the same network of leaving that same network." To the extent this remark can be understood in its present form, Applicants believe that the Examiner is not correctly interpreting the cited passage. Conventional routers, bridges or other types of gateways simply fail to provide an address substitution mechanism of the type claimed herein. If a given device on a local network has a remotely-assigned IP address which will cause communications between other devices on the local network and the given device to traverse an external network, a conventional gateway will not prevent it.

Also, the Examiner in the Advisory Action refers to computers 42 and 43 as having remotely-assigned address information as claimed. Krishnan clearly indicates at column 7, lines 12-21 that computers 42 and 43 "do not have IP addresses assigned by an ISP or other Internet addressing authority," but instead have addresses that are assigned locally, by the administrator of LAN 44. The present application makes it clear that remotely-assigned address information comprises address information that is assigned outside of the local network. See the specification at, for example, page

1, lines 12-20, and page 4, lines 14-23. The portions of Krishnan relating to computers 42 and 43, as relied upon by the Examiner, do not relate to remotely-assigned address information.

Accordingly, Applicants respectfully submit that the Krishnan reference does not teach "each and every element" as set forth in claim 1, in "as complete detail as is contained in the . . . claim," as required by the above-cited portion of MPEP §2131. Furthermore, the arrangements described in Krishnan certainly do not address or solve the particular problems of the prior art addressed and solved by the present invention, and in fact the Krishnan arrangements suffer from those very same problems. It is therefore believed that claim 1 cannot reasonably be viewed as being anticipated by Krishnan.

Independent claims 11 and 21 are believed allowable for substantially the same reasons identified above with regard to independent claim 1.

Dependent claims 2, 3, 5-10, 12, 13 and 15-20 are believed allowable for at least the reasons identified above with regard to their respective independent claims. Moreover, at least claim pairs 5 and 15, 6 and 16, 7 and 17, 8 and 18, and 10 and 20 are believed to define additional separately-patentable subject matter relative to Krishnan and the other art of record, as described in greater detail below.

With regard to claims 5 and 15, each of these claims specifies that the gateway stores remotely-assigned address information for each of a plurality of devices attached to the local network. The Examiner in the final Office Action at page 4, section 6, argues that these limitations are met by the teachings relating to computers 42 and 43 in column 7, lines 22-30 of Krishnan. Applicants respectfully disagree. The limitations in question refer to "remotely-assigned address information," while as previously noted herein Krishnan clearly indicates at column 7, lines 12-21 that computers 42 and 43 "do not have IP addresses assigned by an ISP or other Internet addressing authority," but instead have addresses that are assigned locally, by the administrator of LAN 44. Krishnan therefore fails to meet the limitations in question.

With regard to claims 6 and 16, each of these claims specifies that the gateway stores a set of address substitution information for each of the plurality of devices, with the set of address substitution information for a given one of the devices comprising an address to be used by the given device in communicating with the gateway and addresses to be used by the given device in

communicating with each of the other devices. The Examiner in the final Office Action at page 4, section 7, argues that these limitations are met by the teachings in column 7, lines 31-42 and column 9, line 61 to column 10, line 26 of Krishnan. Applicants respectfully disagree. The cited portions of Krishnan do not disclose storing a set of address substitution information for each of a plurality of devices attached to a local network, with the address substitution information providing separate addresses for use by the given device in communicating with the gateway and with other devices attached to the same local network. Krishnan therefore fails to meet the limitations in question.

With regard to claims 7 and 17, each of these claims specifies that the stored information comprises an address substitution matrix having a row of address information for each of the plurality of devices attached to the local network. The Examiner in the final Office Action at page 4, section 8, argues that the limitation in question is met by the internal LAN address database table disclosed in column 3, lines 28-33 of Krishnan. However, the internal LAN address database table is not an address substitution matrix as claimed, and is instead used to determine "the internal LAN address of the originating computer." It is therefore believed that Krishnan fails to meet the limitations in question.

With regard to claims 8 and 18, each of these claims specifies that a given one of the sets of address substitution information for a particular one of the plurality of devices comprises a set of IP addresses, each of which is sub-network compatible with an IP address remotely assigned to the corresponding device, such that communications between the given device and another one of the devices attached to the local network are not routed through an external network element. The Examiner in the final Office Action at pages 4-5, section 9, argues that such an arrangement is met by the teachings in column 7, lines 17-21 and column 5, lines 38-64 of Krishnan. Applicants respectfully disagree. As described in greater detail above, the cited portions of Krishnan fail, in the presence of remotely-assigned IP address disparity, to prevent the routing of communications between devices on the local network through an external network element. Moreover, references to computers 42 and 43 in Krishnan do not deal with remotely-assigned IP address information, since Krishnan clearly indicates that the IP addresses of these computers are assigned by the local network administrator rather than through a remote assignment mechanism. Krishnan therefore fails to meet the limitations in question.

With regard to claims 10 and 20, each of these claims specifies that the gateway intercepts at least one of control information and maintenance information received over the local network and associated with the given device so as to perform related services on behalf of the given device. The Examiner in the final Office Action at page 5, section 11, argues that these limitations are met by the teachings in column 2, lines 39-46 of Krishnan. Applicants respectfully disagree. The limitations in question refer to the interception of information received over the local network, and the performance of services on behalf of a device, other than the gateway, attached to the local network. The cited portion of Krishnan, in contrast, relates to communication between an ISP, which is typically an external network element, and the gateway itself. The cited passage therefore fails to meet the particular limitations in question.

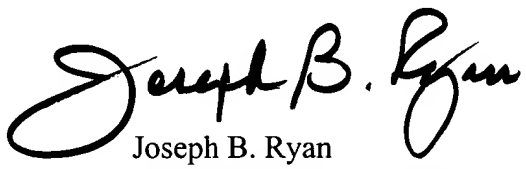
Issue 2

Applicants submit that claims 4 and 14 are allowable for at least the reasons identified above with regard to their respective independent claims. The arguments presented in conjunction with Issue 1 above are therefore realleged and incorporated by reference. The Foley reference fails to supplement the fundamental deficiencies of Krishnan as applied to the independent claims.

Moreover, the combined teachings of Krishnan and Foley fail to disclose a gateway device comprising an ATU-R device with the particular functionality claimed. Although Foley mentions the use of ADSL, it fails to specifically teach the incorporation of the claimed functionality into an ATU-R device. The Examiner fails to identify any objective evidence of suggestion or motivation for the proposed combination. It therefore appears that the Examiner in rejecting claims 4 and 14 has simply undertaken a hindsight-based reconstruction of the claimed invention, with the benefit of the disclosure provided by Applicants.

In view of the foregoing, Applicants believe that claims 1-21 are in condition for allowance, and respectfully request the withdrawal of the §102(e) and §103(a) rejections.

Respectfully submitted,



Date: October 6, 2003

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APPENDIX

1. (Amended) An apparatus for use in interfacing a local network to one or more external network elements, the apparatus comprising:

a gateway coupled between the local network and the one or more external network elements, the gateway being operative to determine remotely-assigned address information for a given device attached to the local network; and to establish, based at least in part on the remotely-assigned address information, a substitution address for use by at least one other device attached to the local network when communicating with the given device.

2. (Amended) The apparatus of claim 1 wherein the remotely-assigned address information comprises an Internet protocol (IP) address assigned to the given device by an external network element.

3. The apparatus of claim 1 wherein the local network comprises a local area network (LAN).

4. The apparatus of claim 1 wherein the gateway comprises an ADSL (asymmetric digital subscriber loop) termination unit-receive (ATU-R) device.

5. The apparatus of claim 1 wherein the gateway stores remotely-assigned address information for each of a plurality of devices attached to the local network.

6. The apparatus of claim 5 wherein the gateway stores a set of address substitution information for each of the plurality of devices, the set of address substitution information for a given one of the devices comprising an address to be used by the given device in communicating with the gateway, and addresses to be used by the given device in communicating with each of the other devices.

7. The apparatus of claim 6 wherein the stored information comprises an address substitution matrix having a row of address information for each of the plurality of devices attached to the local network.

8. (Amended) The apparatus of claim 6 wherein a given one of the sets of address substitution information for a particular one of the plurality of devices comprises a set of IP addresses, each of which is sub-network compatible with an IP address remotely assigned to the corresponding device, such that communications between the given device and another one of the devices attached to the local network are not routed through an external network element.

9. The apparatus of claim 1 wherein the gateway processes a particular received packet in order to replace remotely-assigned address information in a header thereof with a corresponding substitution address determined by the gateway.

10. The apparatus of claim 1 wherein the gateway intercepts at least one of control information and maintenance information received over the local network and associated with the given device so as to perform related services on behalf of the given device.

11. (Amended) A method for use in interfacing a local network to one or more external network elements, the method comprising the steps of:

determining, in a gateway coupled between the local network and the one or more external network elements, remotely-assigned address information for a given device attached to the local network; and

establishing a substitution address for use by at least one other device attached to the local network when communicating with the given device, based at least in part on the remotely-assigned address information.

12. (Amended) The method of claim 11 wherein the remotely-assigned address information comprises an Internet protocol (IP) address assigned to the given device by an external network element.

13. The method of claim 11 wherein the local network comprises a local area network (LAN).

14. The method of claim 11 wherein the gateway comprises an ADSL (asymmetric digital subscriber loop) termination unit-receive (ATU-R) device.

15. The method of claim 11 wherein the gateway stores remotely-assigned address information for each of a plurality of devices attached to the local network.

16. The method of claim 15 wherein the gateway stores a set of address substitution information for each of the plurality of devices, the set of address substitution information for a given one of the devices comprising an address to be used by the given device in communicating with the gateway, and addresses to be used by the given device in communicating with each of the other devices.

17. The method of claim 16 wherein the stored information comprises an address substitution matrix having a row of address information for each of the plurality of devices attached to the local network.

18. (Amended) The method of claim 16 wherein a given one of the sets of address substitution information for a particular one of the plurality of devices comprises a set of IP addresses, each of which is sub-network compatible with an IP address remotely assigned to the corresponding device, such that communications between the given device and another one of the devices attached to the local network are not routed through an external network element.

19. The method of claim 11 wherein the gateway processes a particular received packet in order to replace remotely-assigned address information in a header thereof with a corresponding substitution address determined by the gateway.

20. The method of claim 11 wherein the gateway intercepts at least one of control information and maintenance information received over the local network and associated with the given device so as to perform related services on behalf of the given device.

21. (Amended) A machine-readable medium storing one or more programs for use in interfacing a local network to one or more external network elements, wherein the one or more programs when executed by a processor implement the steps of:

determining, in a gateway coupled between the local network and the one or more external network elements, remotely-assigned address information for a given device attached to the local network; and

establishing a substitution address for use by at least one other device attached to the local network when communicating with the given device, based at least in part on the remotely-assigned address information.